

MORBIDITY AND MORTALITY RATES IN CALIFORNIA'S AIDS DRUG ASSISTANCE PROGRAM, 1997-1999

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AIDS DRUG ASSISTANCE PROGRAM, 1997-1999**

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EXECUTIVE SUMMARY

Objectives. Our objectives were to: 1) examine morbidity (hospitalization) and mortality (death) rates in California's AIDS Drug Assistance Program (ADAP); 2) determine if demographic variables such as gender, race/ethnicity, age, geographical location, and type of antiretroviral (ARV) therapy affect these health outcomes; 3) identify predictors of mortality among clients exclusively funded by ADAP; and 4) examine co-morbid conditions in the program.

Design. Morbidity and mortality rates were calculated for California's 1997-1999 ADAP population for various demographic subgroups. Based on standard treatment guidelines, drug combinations were classified as high, medium, or low amount of "preferred" therapies. Exact test and t-test statistics were used to compare group differences on mortality and morbidity, respectively. A logistic regression model of mortality was developed.

Results. Whites had the highest mortality rates, while Hispanics/Latinos had the lowest rates. Older age groups had higher mortality rates, more hospital visits, and longer stays than younger clients. African Americans had more hospital visits and longer stays than others. Clients on "preferred" ARV therapies had lower mortality rates and slightly fewer hospital visits than those on "non-preferred" therapies.

Conclusions. While demographic differences were found in morbidity and mortality rates among ADAP clients, the overall number of hospitalizations and deaths was low. California's ADAP appears effective in terms of improving the health outcomes of the population it serves.

INTRODUCTION

Evaluation is the process of examining the efficiency, effectiveness, and impact of a program. The results address the extent to which the program was productive in comparison to its resources (*efficiency*), the extent to which goals or objectives were achieved (*effectiveness*), and the extent to which the program led to changes (*impact*). There are several types and models of evaluation, which consider different issues and focus on specific aspects of the evaluation. Outcome evaluation, for example, seeks to determine the degree to which a program has met its goals and objectives. It is conducted for the purpose of making decisions about program continuation, expansion, and funding. It also attempts to answer specific research questions: To what extent are the desired client outcomes being attained? What are the effects of the program on targeted clients? *Such research questions were explored in the present evaluation of California's ADAP, one of several Ryan White (RW) funded programs.*

In 1990, Congress passed the RW Comprehensive AIDS Resources Emergency (CARE) Act. The purpose of the CARE Act was to provide emergency assistance to localities that were disproportionately affected by HIV disease. When Congress reauthorized the CARE Act in 1996, it did so with particular emphasis on the importance of accountability. More specifically, the revised CARE Act stressed the need for grantees to take into consideration cost and outcome effectiveness of service delivery systems when prioritizing which services were to be funded. Evaluation studies can then be used not only to maximize CARE Act dollars, but also to improve program cost effectiveness and maximize the service delivery system. Hence, it is necessary that we evaluate CARE Act program outcomes to determine the impact on target populations. More recently, the CARE Act Amendments of 2000 reauthorized the RW programs for the second time.

ADAP

Title I of the CARE Act provides emergency relief assistance to 51 eligible metropolitan areas (EMAs) nationwide with the highest incidence rates of HIV/AIDS epidemic. There are nine Title I grant awards within California: Los Angeles, Oakland, Orange County, Riverside-San Bernardino, Sacramento, San Diego, San Francisco, San Jose, and Santa Rosa-Petaluma.

The California Department of Health Services (DHS), Office of AIDS (OA) is the grantee for CARE Act Title II funds for California. These Title II funds are used to support ADAP, Home and Community Based Care Program (HCBC), CARE/Health Insurance Premium Program (CARE/HIPP), and HIV/AIDS CARE Services Program.

The OA has entered into a contract with the Ramsell Corporation, a pharmacy benefits manager (PBM). The PBM directs the network used to enroll new clients, recertify continuing clients, and receives and updates pharmaceutical records for ADAP clients. The PBM forwards the data collected through the network to the OA. The OA maintains this statewide database, which contains information from the centralized program on all

CARE Act clients in California who receive prescription drugs through ADAP. The ADAP database includes client demographics, CD4 counts, and the frequency, types, and costs of prescription drugs accessed by each client. In 2001, for example, ADAP served 23,668 clients who accessed 668,580 prescriptions yielding a cost of \$151.5 million.

HIV/AIDS Morbidity and Mortality

Since 1981, AIDS deaths increased dramatically from 129 to over 50,000 in 1995 (1). With the Food and Drug Administration's (FDA) approval of protease inhibitors (PIs) in 1995 and the introduction of three-drug combinations known as highly active antiretroviral therapy (HAART) in 1996, the number of AIDS deaths decreased 43 percent in 1997, 19 percent in 1998, and 12 percent in 1999. Thus far, there is a 41 percent decrease in 2000 AIDS deaths but reporting delays will change this figure.

The effectiveness of HAART in reducing both hospitalizations and deaths related to HIV/AIDS infection are well documented (2-9). By reducing the viral load, or amount of HIV within the body, to the lowest level for as long as possible, HAART may save the lives of those in advanced stages of infection, forestall the progression from HIV to AIDS, allow individuals to live longer and healthier lives, and decrease the transmissibility of the virus.

Treatment Guidelines for HIV-Infected Persons

Since the mid-1990s, two major groups in the United States have developed and continually updated guidelines for the use of ARV therapy in the treatment of HIV/AIDS infection: Department of Health and Human Services (DHHS) and Henry J. Kaiser Family Foundation which publishes the Guidelines for the Use of Antiretroviral Agents in HIV-Infected Adults and Adolescents (10) and International AIDS Society-USA (IAS-USA) which publishes the Antiretroviral Therapy in Adults: Updated Recommendations of the IAS-USA Panel (11).

Despite differences in panel membership, methodology, and source of funding, treatment recommendations from both groups are highly similar and address the same core issues—when to initiate ARV therapy, what to start with, when to change ARV therapy, and what to change to. DHHS, for example, currently classifies regimens for initial treatment into four categories: strongly recommended, recommended as alternatives, no recommendation, and not recommended.

A 1986-1998 meta-analytic study concluded that adherence to the treatment guidelines reduced morbidity and mortality in the short-term, but the long-term effects were unknown (12). In California, ADAP clients were accessing more optimum HAART than Medi-Cal patients (13). Also, Hispanics/Latinos accessed more HAART than Whites and African Americans. However, hospitalizations and deaths in relation to varying amounts of HAART treatment in ADAP were not examined.

THE PRESENT STUDY

The HIV/AIDS Bureau (HAB) has identified six major areas of evaluation to guide the assessment of services provided by the CARE Act: 1) serving underserved/vulnerable populations; 2) providing clients with quality HIV/AIDS care; 3) providing services that remove barriers to receiving primary care; 4) reducing morbidity; 5) reducing mortality; and 6) adapting to a changing service and cost environment.

To address morbidity and mortality, specific evaluation questions have been raised:

1) To what extent are RW CARE Act programs reducing morbidity, as indicated by reductions in opportunistic infections and related hospitalizations, increases or slowed rates of decline in CD4 counts, and declines in perinatal transmission of HIV; and 2) To what extent are RW CARE Act programs reducing HIV-related mortality?

The present study examined the effectiveness of ADAP in California, a Title II program, in terms of reducing morbidity and mortality. Thus, the geographical area of particular interest was the entire state of California. Participants were persons living with HIV/AIDS (PLWH/A) who accessed prescription drugs through ADAP during 1997-1999.

Specifically, the study looked for differences between morbidity and mortality rates among ADAP clients, as indicated by reductions in the rate of HIV/AIDS-related hospitalizations and deaths. Demographic data was analyzed to investigate differences as a function of gender, race/ethnicity, age, geographical location (Title I/urban regions versus Title II/rural regions), and type of ARV therapy accessed. Additional HIV/AIDS-related health outcomes included viral loads.

Hypotheses

Several hypotheses were formulated for this study:

1. No gender, race/ethnicity, age, or geographical location were expected on morbidity and mortality rates among ADAP clients.
2. No demographic differences were expected in viral load copies among ADAP clients.

For ADAP clients who were exclusively funded by the program (and not receiving prescription drug benefits from outside sources):

3. Clients on preferred ARV therapies would have lower morbidity and mortality rates than clients on non-preferred therapies.
4. Clients on preferred therapies would also have lower viral loads than their counterparts.

Finally, exploratory analyses attempted to identify predictors of mortality among ADAP-only funded clients and examine co-morbidities among California's ADAP population.

METHOD AND PROCEDURES

ADAP Population

ADAP. From 1997-1999, California's ADAP served between 18,173 to 20,886 clients annually. An ADAP client was defined as an HIV-positive individual who accessed *at least one* prescription drug through the program. Table 1 shows the number and percentage of clients meeting this criterion in one year, any two years, or all three years of our study. Thirty percent of all clients received services in each of three years. Overall, 30,791 unduplicated clients were served.

The annual length of stay in ADAP or number of months a client accessed a prescription within a given year is shown in Table 2. The mean stay increased over time (5.59 in 1997, 6.61 in 1998, and 6.89 in 1999). Overall, the mean length of stay *in the study period* was 11.90 months. It is important to note that this statistic is left and right truncated and may or may not reflect clients' length of stay *in ADAP*.

Demographic variables of interest included gender (male or female), race/ethnicity (White, African American, Hispanic/Latino, or Other), age group (18-30 years old, 31-40 years old, 41-50 years old, or Over 50 years old), and geographical location (Title I/urban regions versus Title II/rural regions). Age was calculated from the number of years between the client's date of birth and the midpoint of our study, July 1998 (see Footnote A). Geographical location was based on the client's residency at the time of last prescription accessed during our study (see Footnote B).

Data Sets Matched and Dependent Variables

Death Statistical Master Files. Death certificate records for California residents who died between 1997-1999 were obtained through DHS, Office of Vital Records, Vital Statistics Section. ADAP clients were matched with death records based on Social Security Number, date of birth, and gender. As a precautionary check, we ensured the client was not accessing prescriptions after time of death. Race/Ethnicity was also inspected but not used as a strict criterion. We retrieved 1,027 death records and counted ***all causes of death, regardless of their relation to HIV/AIDS (see Footnote C).*** For 1997 and 1998, ICD-9 (International Classification of Diseases, 9th Revision) underlying cause of death group codes were used and combined into broader categories, and for 1999, ICD-10 death group codes were used (see Footnote D).

For death records without a Social Security Number, we matched on a unique record number (i.e., 11-character string based on the first and third letters of a person's first and last names, respectively, date of birth, and gender). An additional 86 death records matched from using this method for a total of 1,113.

Mortality rates per 1,000 client months were derived by dividing the number of client deaths by the number of client months-at-risk (per quarter or per year) and multiplying the result by 1,000. Differences in annual mortality rates were examined using an exact test based on a binomial distribution where $d \sim \text{binom}(n, p)$ under the null hypothesis $r_i = r_j$ (See Appendix A). To maintain an alpha level at .05, we used a Bonferroni adjustment based on the number of pair-wise comparisons per variable of interest.

Office of Statewide Health and Planning and Development (OSHPD) Hospital Patient Discharge Files. Hospital discharge records for all patients admitted to California's non-federal licensed facilities were retrieved. Again, Social Security Number, date of birth, and gender were used as the matching criterion. Unlike the mortality data, all hospitalizations were *not* used. Rather, only hospital admissions with HIV/AIDS as the primary diagnosis, or 1 of 24 other diagnoses (ICD-9 codes) were counted; 9,909 records matched. Because the OSHPD data did not include names, we could not perform an alternative match with unique record numbers for those hospitalized without a Social Security Number.

Mean hospitalizations and lengths of stay were computed for both annual clients and hospitalized clients only. None of the clients' hospital stays extended from one year to the next. T-tests were computed to examine differences in demographic variables. To maintain an alpha level at .05, we used a Bonferroni adjustment based on the number of pair-wise comparisons per variable of interest.

Viral Load Testing Program (VLTP). Beginning in October 1, 1997, DHS Viral and Rickettsial Disease Laboratory provides viral load tests for HIV-infected persons. Since eligibility requirements are similar to that of ADAP (uninsured, not on Medi-Cal, and income less than \$50,000), a large proportion of VLTP clients are also ADAP clients. Testing is performed at approximately 150 HIV service sites.

Viral load tests for 1997 were not examined, because only three months of data were available. For 1998 and 1999, annual scores from the two most common assay tests (PCR or bDNA) were categorized according to DHHS guidelines (for PCR, <1,501, 1,501-7,000, 7,001-20,000, 20,001-55,000, and >55,000; and the equivalents for bDNA, <501, 501-3,000, 3,001-10,000, 10,001-30,000, and >30,000).

For 1998, 12,698 tests for 6,076 unduplicated clients were used, and for 1999, 16,968 tests for 7,748 unduplicated clients were used. Prior to categorization, viral load tests were averaged per quarter and then averaged per year for the single annual score. This would provide a more representative score for clients whom had several tests during one quarter of the year. Because viral load tests were available for approximately one-third of our clients in 1998 and 1999, only descriptive statistics (and not tests of significance) were used to explore the data.

Antiretroviral Users with ADAP as Only Payer (AUAOP) and ARV Treatment Groups

AUAOP. Since ADAP is the payer of last resort, clients may also be accessing prescription drug benefits from Medi-Cal or private insurance providers. (State general funds are used to pay Medi-Cal clients' share of cost.) Thus, AUAOP were identified, because all of their utilization patterns could be accessed. For 1997, the payer coverage group code was not available, and this data set was not used. Based on 1998 and 1999 clients, AUAOP were 62 percent of the two-year population (15,539 out of 25,193).

Drug Utilization Patterns. AUAOP were screened for further analyses. Using the client patterns method (see Footnote E), we examined the prescription claims of each client on an individual basis. Derived from the number of ARVs taken and the presence or absence of PIs, nucleoside analog reverse transcriptase inhibitors (NARTIs or "nukes"), and non-nucleoside reverse transcriptase inhibitors (NNRTIs or "non-nukes"), monthly drug prescriptions were grouped into one of four categories (see Footnote F):

- Preferred (e.g., one PI plus two NARTIs);
- Alternative (e.g., one NNRTI plus two NARTIs);
- Not generally recommended (e.g., two NARTIs); and
- Not recommended (e.g., all monotherapies).

Drug combinations were categorized with a tendency toward preferred treatment. For example, if a client accessed one PI plus two NARTIs in a given month, regardless of other prescriptions, the monthly prescription pattern would be categorized as preferred treatment.

Each AUAOP contributed four scores representing the percentage of prescription claims that fell within each category from 1998-1999. For example, if a client was enrolled in the program during all of 1999, he would have accessed 12 months of prescriptions. If six were preferred, two were alternative, two were not generally recommended, and two were not recommended treatments, he would have accessed 50 percent (6/12) recommended, 17 percent (2/12) alternative, 17 percent (2/12) not generally recommended, and 17 percent (2/12) not recommended treatments.

ARV Treatment Groups. Ultimately, *a single score representing the amount of preferred treatment each client accessed was derived from the sum of the preferred and alternative therapies.* This score provides a general measure of the consistent use of ARV treatment over time. After examining the distribution of scores, three ARV Treatment Groups were designated: High (76 percent or more), medium (50-75 percent), and low (0-49 percent). From the above example, the client would have a single score of 67 percent and be categorized in the Medium ARV Treatment Group.

RESULTS

ADAP Demographics. Table 3 shows the percentage of annual and unduplicated clients by the demographic variables. Overall, for gender, 89 percent were male and 11 percent were female. For race/ethnicity, 45 percent were White, 18 percent were African American, 30 percent were Hispanic/Latino, and 2 percent were Other. For age group, 17 percent were 18-30 years old, 46 percent were 31-40 years old, 27 percent were 41-50 years old, and 9 percent were Over 50 years old. For geographical location, 91 percent resided in Title I/urban regions and 7 percent resided in Title II/rural regions. When examining the demographics per year, these percentages remained stable except for one trend in age group: 18-30 year olds decreased by 2 percent each year, while 41-50 year olds had a corresponding 2 percent increase.

Mortality

ADAP Deaths. Table 4 shows the number and percentage of client deaths per year by the service years clients accessed prescriptions through ADAP. As expected, more deaths occurred over time. Over the three-year period, however, fewer clients who accessed services in only one year died within the same year. For 1997 clients only, 13 percent died within the same year. For 1998 and 1999 clients only, these figures decreased to 9 percent and 8 percent, respectively. The largest amount of deaths occurred in 1998 (19 percent) by clients who had accessed services in both 1997 and 1998.

Leading Cause of Death. In each year, HIV/AIDS-related deaths accounted for an overwhelming majority of deaths among ADAP clients despite a decrease in 1998 (see Table 5). Cancer and heart disease were the second and third leading cause of death in 1997 (13 percent and 4 percent) and 1998 (11 percent and 5 percent). In 1999, however, heart disease and cancer were in second and third place, respectively (6 percent and 5 percent). Also, hepatitis dropped out of the top five leading causes of death and suicide (3 percent) emerged on the list.

Mortality Rates per Quarter. Figure 1 shows the quarterly mortality rates per 1,000 client months-at-risk for all ADAP clients and by gender. Since our study design entered most clients at the beginning of 1997, mortality rates were artificially decreased at the onset of the graph. The mortality rate for all clients tended to "level-off" near the midpoint of our study, ranging from 1.56 in the third quarter of 1998 to 1.83 deaths in the fourth quarter of 1999.

Since 89 percent of ADAP clients are male, the quarterly mortality rate for males mirrored that of the overall population. For females, after the initial increase, mortality rates dropped as low as 0.80 in the fourth quarter of 1998, but bounced back and peaked at 2.65 in the fourth quarter of 1999. It is important to note that the small number of female clients and subsequent deaths yielded greater variability in their data.

Annual Mortality Rates by Demographics. Using a binomial test statistic, we examined annual mortality rates by our demographic variables (see Appendix B for actual test statistics.) As hypothesized, no gender or geographical location differences were found on mortality rates from 1997-1999, all $p>.05$ (see Table 6).

Also, in 1997, no race/ethnicity or age group differences were found on mortality rates, all $p>.017$ (see Footnotes G and H). In 1998, Whites had higher mortality rates (1.90) than both African Americans (1.23, $p<.002$) and Hispanics/Latinos (1.17, $p<.000$). No differences were found between African Americans and Hispanics/Latinos, $p<.430$. By contrast, in 1999, Hispanics/Latinos had lower mortality rates (1.29) than both Whites (1.97, $p<.001$) and African Americans (1.94, $p<.000$). No differences were found between the latter two groups, $p<.483$.

For age group, similar findings were seen in both 1998 and 1999. Forty-one to 50 year olds had higher mortality rates (1.94 and 2.27, respectively) than the younger age groups, all $p<.000$. Thirty-one to 40 year olds also had higher mortality rates (1.21 and 1.41) than 18-30 year olds (0.71, $p<.004$; and 0.80, $p<.000$). The category Over 50 year olds was not tested due to a smaller sample size and to limit the number of pair-wise comparisons.

Morbidity

ADAP Hospitalizations. Table 7 summarizes the hospitalization data for both annual clients and for those hospitalized only. As with mortality, more hospitalizations occurred over time. In 1997, the mean number of visits was 0.14 and length of stay was 0.93 days. But for the latter two years, the visits (0.19 in 1998 and 1999) and stay were relatively constant (1.36 in 1998 and 1.32 in 1999).

When examining hospitalized clients only, the same pattern should be expected. In 1997, mean visits were 1.65 and length of stay was 11.03. For both 1998 and 1999, means visits were 1.85, and mean stay was 13.17 and 13.13, respectively. The median length of stay for each year was 7.00 days.

Leading Cause of Hospitalizations. HIV infection was the leading cause of hospitalization each year accounting for 50 percent of all visits in 1997 and 1998 before decreasing to 44 percent in 1999 (see Table 8). Pneumonia was always the second leading cause of hospitalization. Other top five causes of hospitalization included pneumocytosis, pancreatitis, major depressive disorder, and clinical research exam, but each cause was less than 2 percent of the cases.

Mean Hospitalizations and Length of Stay per Quarter. Figure 2 shows the quarterly mean hospitalizations per 1,000 clients for all ADAP clients and by gender. Unlike the mortality data, these are not cumulative clients across the study, but reflect clients accessing services per quarter, and include multiple visits per client within a quarter and duplicated clients across time. Overall, mean hospitalizations per 1,000 clients were 53.69 in 1997, increasing to 67.50 in 1998, and decreasing to 64.57 in 1999.

For gender, mean hospitalizations for males closely paralleled the overall population with 54.25 in 1997, 67.17 in 1998, and 64.51 in 1999. Females, in contrast, varied more than males with 49.79 in 1997, 70.79 in 1998, and 65.25 in 1999.

Quarterly mean length of stay (in days) for all ADAP clients and by gender is shown in Figure 3. The general trend was similar to that of mean hospitalizations. In 1997, all clients and males spent the least amount of time in the hospital (0.36 each), followed by an increase in 1998 (0.48 each), and remaining stable in 1999 (0.46 each). Although females appeared more extreme on a quarterly basis, they only differed from males annually in 1997 (0.30). Mean length of stay for females was 0.49 in 1988, and 0.47 in 1999.

Annual Hospitalizations by Demographics. The mean number of hospital visits and length of stay *for all clients* is shown in Table 9 (see Appendix C for actual test statistics). For gender and geographical location, only one significant difference emerged for each variable across 1997-1999. In 1997, males had longer stays (0.57) than females (0.43), $t(18,076) = 2.20$, $p < .028$; and in 1998, clients residing in Title I/urban regions had shorter stays (0.69) than clients in Title II/rural regions (0.69), $t(17,005) = -2.23$, $p < .026$. No other differences were found for gender or geographical location, all $ps > .05$.

For race/ethnicity, in 1997, Hispanics/Latinos had fewer hospital visits (0.11) than both Whites [0.15; $t(14,012) = -3.71$, $p < .000$] and African Americans [0.15; $t(8,509) = -3.47$, $p < .001$]. No differences were found between the latter two groups, $t < 1.96$. On length of stay, however, African Americans had longer stays (0.68) than Whites [0.52; $t(11,641) = 3.17$, $p < .002$]. No differences were found between African Americans and Hispanics/Latinos (0.55) or Whites and Hispanics/Latinos ($ps > .017$).

In 1998 and 1999, the same pattern of results occurred for race/ethnicity (see Table 9 for mean values). African Americans had more hospital visits and longer lengths of stay than Whites and Hispanics/Latinos; and Whites had more hospitalizations and longer stays than Hispanics/Latinos, $ps < .017$ (see Footnote I).

For age group, with one exception, a linear trend was found on both hospital visits and length of stay from 1997-1999. Clients aged 41-50 years old had more hospitalizations and longer stays than the younger age groups; and 31-40 years old had more visits and longer stays than 18-30 year olds, all $ps < .017$. The only non-significant finding came in 1997, when no difference was found on length of stay between 31-40 year olds and 41-50 year olds, $p > .017$.

Since clients may have more than one hospitalization, we also examined hospital visits and length of stay for *hospitalized clients only* (see Table 10; actual test statistics appear in Appendix D). Significant findings were found only for race/ethnicity. In 1998, African Americans had more hospital visits (2.03) than Whites (1.74), $t(1,320) = 3.15$, $p < .002$. Across each year, both African Americans and Hispanics/Latinos had longer

stays than Whites, $t_s > 1.96$. No other differences were found for race/ethnicity or for gender, age group, or geographical location, $p_s > .017$.

Viral Load

Viral load tests for 1998 and 1999 clients by demographic variables are shown in Table 11. Overall, across all variables and years, 42-52 percent of ADAP clients had viral loads $< 1,501$. Clients appeared somewhat equally divided among the other categories, but the second most frequent category was $> 55,000$ (12-20 percent). Thus, we focused our results on the lowest and highest categories.

For gender, more females had viral loads $< 1,501$ than males (52 versus 46 percent) in 1998. The following year, this discrepancy decreased (50 percent for females and 48 percent for males). In the $> 55,000$ category, males were more frequent than females in 1998 (16 versus 12 percent) but similar frequencies occurred in 1999 (17 versus 16 percent).

For race/ethnicity, more Whites had viral loads $< 1,501$ (50 percent) than African Americans (42 percent) and Hispanics/Latinos in 1998 (44 percent). Hispanics/Latinos increased to 48 percent in 1999, Whites showed no change at 50 percent, but African Americans remained the lowest in this category (44 percent). In 1998, African Americans were comparable to Hispanics/Latinos in the $> 55,000$ category (17 percent each), both of which were slightly more than Whites (15 percent). Although a small difference in 1999, more African Americans had viral loads $> 55,000$ (19 percent) than Whites (17 percent) and Hispanics/Latinos (16 percent).

For age group, the older the clients, the more frequent viral loads $< 1,501$. That is, more 41-50 year olds had viral loads $< 1,501$ (49 percent each in 1998 and 1999) than 31-40 year olds (45 percent in 1998 and 48 percent in 1999) and 18-30 year olds (44 percent in 1998 and 43 percent in 1999). On viral loads $> 55,000$, all age groups were similar in 1998 (15-17 percent) and in 1999 (16-19 percent).

For geographical location, slightly more clients residing in Title I/urban regions (47 percent) had viral loads $< 1,501$ than clients residing in Title II/rural regions (44 percent). No difference occurred in 1999 (48 percent each). For those with viral loads $> 55,000$, in 1998, more Title II than Title I residents appeared in this category (20 percent versus 16 percent). In 1999, Title II residents decreased to 15 percent whereas Title I residents remained stable at 17 percent.

AUAOP

Demographics. In sum, AUAOP demographics were similar to ADAP demographics with one exception on race/ethnicity. For unduplicated clients, Whites and Hispanics/Latinos were 38 percent and 37 percent of AUAOP but African Americans were only 18 percent of this population (see Table 12). In contrast, for the unduplicated ADAP clients, 45 percent were White, 30 percent were Hispanic/Latino, and 18 percent

were African American (see Table 3). Thus, more Hispanics/Latinos and fewer Whites were AUAOP.

AUAOP Mortality

Mortality Rates per Quarter. Quarterly mortality rates for AUAOP and by ARV Treatment Group are shown in Figure 4. Overall, AUAOP mortality rates differed from the mortality rates of all ADAP clients (see Figure 1). Despite the initial increase in rates for both groups, AUAOP mortality rates reached its peak earlier, decreased noticeably before “leveling-off,” and, most importantly, were lower than that of all ADAP clients in the latter part of our study.

When breaking up AUAOP by ARV Treatment Group, those accessing low amounts of preferred (and alternative) treatments had higher mortality rates each quarter than those accessing medium and high amounts of preferred treatments. The high treatment group had low mortality rates throughout the study. The medium treatment group had similar mortality rates to the high group, but showed more variability in their rates due to smaller sample sizes.

Annual Mortality Rates by ARV Group. We examined annual mortality rates for ARV Treatment Groups based on the amount of preferred drug therapies accessed (see Table 13 for descriptive statistics and Appendix E for actual test statistics). In 1998 and 1999, AUAOP accessing high amounts of preferred treatments had lower mortality rates than those accessing low amounts (0.88 versus 1.77 in 1998, and 0.97 versus 1.60 in 1999), all $p < .017$. The medium treatment group also had lower mortality rates (0.70) than the low group in 1998, $p < .017$.

AUAOP Morbidity

Mean Hospitalizations and Length of Stay per Quarter. Figure 5 shows the quarterly hospitalizations for AUAOP and by ARV Treatment Group. Similar to hospitalizations for all ADAP clients, the rates go up-and-down over the quarters but AUAOP rates were lower than all clients.

For ARV Treatment Group, clients accessing high amounts of preferred treatments had fewer hospitalizations per quarter than those accessing medium or low amounts. Hospitalizations for the low treatment group tended to decrease over time but were higher than other groups for most quarters.

Figure 6 shows the quarterly mean length of stay for AUAOP and by ARV Treatment Group. The same pattern emerged for all groups. Initial rates increased, followed by a steep decrease at the end of 1998, then a small increase at the beginning of 1999, and a small decrease for the remainder of the study. The high treatment group had the lowest quarterly stays in the hospital, while the low treatment group had the highest quarterly stays.

Annual Morbidity Data by ARV Group. On morbidity rates, the high treatment group had significantly less hospital visits (1.66) than the low group (1.93) in 1998, $t(657) = -2.40$, $p < .017$ (see Table 14). This difference was only *marginally* significant in 1999 (1.65 versus 1.93; $t(737) = -2.23$, $p < .026$). The medium treatment group did not differ from others in both years, all $ps > .017$.

On length of stay, no significant differences were found between treatment groups in both years, all $ps > .017$. However, in 1998, the medium treatment group had *marginally* significant shorter stays in the hospital (5.92) than the high group [7.36; $t(568) = -2.19$, $p < .029$] and low group [7.41; $t(399) = -2.19$, $p < .026$] (see Appendix F for all test statistics).

Exploratory Analyses

For exploratory purposes, we conducted two additional analyses: 1) a logistic regression model of AUAOP deaths; and 2) the frequency of co-morbidities (e.g., co-existing diseases or illnesses) among all ADAP clients.

Logistic Regression Model of AUAOP Deaths. To estimate the probability of death in ADAP, we built a logistic regression model of AUAOP deaths. The dependent variable, death, was coded as one if the client died and zero otherwise. Predictor variables tested included gender, race/ethnicity, age group, geographical location, ARV Treatment Group, and length of stay ratio. This ratio was based on the number of months a client accessed a prescription drug divided by the maximum number of months a client could have accessed a drug (e.g., the time period when the client accessed his or her first and last drug).

Table 15 shows the results of our full model with all predictors in the equation. Significant predictor variables were race/ethnicity, age group, and ARV Treatment Group. That is, Hispanic/Latino deaths were less likely than Whites (OR = 0.73, 95 percent CI = 0.55, 0.96), 41-50 year olds (OR = 2.38, 95 percent CI = 1.61, 3.52) and Over 50 year olds deaths (OR = 4.01, 95 percent CI = 2.57, 6.24) were more likely than 18-30 year olds, and those accessing high (OR = 0.53, 95 percent CI = 0.41, 0.67) and medium amounts of preferred therapies (OR = 0.56, 95 percent CI = 0.39, 0.81) were less likely to die than those accessing low amounts. Gender, geographical location, and length of stay ratio did not have a significant effect on deaths among AUAOP. Based on the likelihood-ratio test, the full model was significant, $\chi^2(11) = 106.14$, $p < .000$. Sixty-three percent of deaths were predicted accurately.

Table 16 shows the logistic regression results for our final model. Using the backward selection method, only significant predictors remained in the equation, $\chi^2(11) = 102.59$, $p < .000$. In comparison to the full model, 61 percent of deaths were predicted accurately. Additional comparisons revealed no difference between Hispanics/Latinos and African Americans (OR = 0.77, 95 percent CI = 0.55, 1.08). Both 41-50 year olds (OR = 1.73, 95 percent CI = 1.32, 2.27) and over 50 year olds (OR = 2.91, 95 percent CI = 2.07, 4.10) were more likely to die than 31-40 year olds.

ADAP Co-Morbidities. Based on data available in ADAP, co-morbid conditions were identified as physical diseases such as hepatitis C, sexually transmitted diseases (STDs; herpes), mental illness (depression), tuberculosis (TB), and social conditions such as homelessness and incarceration (see Footnote J). Table 17 shows the frequency of co-morbidities and the annual number of unique clients with at least one condition. By 1999, 45 percent of ADAP clients had a co-morbid condition; the three leading co-morbidities were herpes (24 percent), depression (20 percent), and incarceration (10 percent). Herpes was also the leading co-morbidity in 1998 (25 percent), but only 5 percent of ADAP clients were incarcerated. Antidepressants were not added to the ADAP formulary until September 1998 so a comparison between 1998 and 1999 would be misleading. Although limited data was available, herpes was the leading co-morbidity in 1997 (27 percent).

Clients accessing TB drugs remained at 2-3 percent across the three years. Hepatitis C drugs remained stable at less than 1 percent of clients. It is important to note that these findings were primarily based on ADAP formulary drugs and probably underestimated co-morbid conditions among the ADAP population. Since we were interested in co-morbidities among the ADAP population as a whole, AUAOP were not the focus of these analyses. Despite these limitations, 45 percent of clients in 1999 had a co-morbid condition.

DISCUSSION

In the present study, morbidity and mortality rates were examined for 1997-1999 ADAP clients. It was predicted that no demographic differences would be found, and clients on preferred ARV therapies would have lower morbidity and mortality rates than others on non-preferred therapies.

We found partial support for our hypotheses. As expected, no gender or geographical location differences were found on mortality rates in all three years, and no race/ethnicity or age group differences emerged in 1997. In 1998, however, Whites had higher mortality rates than both African Americans and Hispanics/Latinos, and in 1999, Whites and African Americans had higher mortality rates than Hispanics/Latinos. While Hispanics/Latinos were shown to access more HAART than others in California, small differences occurred between Whites and African Americans (13, 15). The increase in African American deaths may suggest delay in seeking treatment. Barriers to care may include lack of or conflicting information regarding HIV/AIDS treatments, stigma (e.g., fear of bringing medications home and casual contagion), distrust of providers (13), poor health literacy (16), and poverty and homelessness (17).

For age group, in both 1998 and 1999, 41-50 year olds had the highest mortality rates, and 31-40 year olds had higher mortality rates than 18-30 year olds. (Over 50 year olds were not included in these analyses to limit the number of comparisons.) While these findings were not hypothesized, it was reasonable to expect that older clients, as in the general population, to have more deaths than their younger counterparts. The progression from HIV infection to the development of AIDS may take ten years. The serious impairment of one's immune system is likely to ultimately lead to his or her death.

Overall, about two-thirds of all ADAP deaths were HIV/AIDS-related. Heart disease and cancer were a distant second and third leading cause of death (10-15 percent total). Hepatitis was a top five leading cause of death in 1997 and 1998, but was replaced by suicide in 1999. Accidental poisoning was also a reoccurring leading cause of death. These results emphasize the possible need for more counseling and educational services for those HIV/AIDS-infected individuals on ARV therapies to ensure they are taking their medications properly to save their lives.

Race/ethnicity and age group differences were also found in our morbidity data. While the results slightly varied per year, African Americans tended to have more hospital visits and longer lengths of stay in the hospital than Whites and Hispanics/Latinos. Hispanics/Latinos tended to have fewer visits and shorter stays than Whites. As with the mortality data, delay in seeking treatment may explain the African American findings. Age group differences occurred in all three years and matched the mortality data. That is, older clients had more hospital visits and longer lengths of stay than younger clients.

HIV infection caused 45-50 percent of all hospitalizations. Other causes accounted for less than 2 percent each and included pneumonia, pneumocytosis, and major depressive disorder. The latter reinforces the importance of counseling and support services for those with HIV.

When examining the drug utilization patterns for 1998-1999 AUAOP only, as predicted, clients accessing high amounts of preferred ARV therapies had lower mortality rates and fewer hospital visits than those accessing low amounts. No differences were found on length of hospital stays. These findings confirm the effectiveness of preferred ARV drug combinations. However, factors such as treatment failure, drug resistance, and toxic side effects may prevent *all* clients from taking preferred medications.

A logistic regression analysis with AUAOP clients replicated our earlier findings on mortality rates. The groups less likely to die were Hispanics/Latinos (versus Whites), 18-30 and 31-40 year olds (versus 41-50 and Over 50 year olds), and clients accessing high amounts of preferred treatments (versus low amounts). No differences were found between African Americans and Whites or Hispanics/Latinos.

Finally, our exploratory analysis found that nearly 50 percent of all ADAP clients in 1999 had a co-morbid condition with STD (herpes), mental illness (depression), and incarceration leading the categories. Such findings stress the importance of keeping non-HIV medications on the ADAP formulary and providing transitional services for jailed clients to continue accessing drugs when released. Under the Transitional Case Management Program, community-based organizations work with local or county jails to offer such a service for California's incarcerated ADAP clients.

There were several limitations to our study: 1) We only examined three years worth of data. Since most clients entered the study in the first year, mortality rates were artificially deflated in this period. It was difficult to assess any trends over time in the following two years. A five-year study would be able to provide this information; 2) Only California deaths and hospitalizations were collected. If a client changed state residency and/or was hospitalized outside of California, this data was not included in our findings. It is reasonable to expect a few cases in these categories, but not enough to significantly change our results; 3) In 1997, the key variable to identify clients solely funded by ADAP was unavailable. Also, prescriptions accessed for clients with Medi-Cal and/or private insurance were not available. Since our AUAOP analyses with ARV treatment groups only covered 1998-1999 clients, the statistical power of our tests was reduced; and 4) Similarly, viral load measures were only available in 1998 and 1999, and less than 40 percent of ADAP clients had test results. Because of the low number of scores and a possible selection bias, we only provided descriptive data and did not test our original hypotheses regarding viral load although gender differences are well documented (18).

While mortality differences occurred along racial/ethnic lines, it is important to keep in mind that the overall number of deaths remained low. In addition, we included *all* causes of death (and not just those related to HIV/AIDS) and *all* ADAP clients regardless of their length of stay in the program.

Future research will continue to examine health outcomes among ADAP clients in several ways. We will compare AIDS-diagnosed ADAP clients with AIDS-diagnosed non-ADAP clients to determine survival rates for each group and identify which group lives longer. Next, we will attempt to find out what happens to ADAP clients after they leave the program to ensure that they are still receiving care and treatment. We also plan on matching our ADAP clients with STD and TB databases to examine co-morbidities more completely. Finally, efforts have been made to collect current and historic CD4 counts and viral load measures for all ADAP clients. Then, we can replicate our current study with a more comprehensive effort over a longer period of time.

REFERENCES

1. Centers for Disease Control and Prevention. *HIV/AIDS Surveillance Report* 2000;11(2):30.
2. Anderson, K.H., Mitchell, J.M. Differential access in the receipt of antiretroviral drugs for the treatment of AIDS and its implications for survival. *Arch Intern Med*. 2000;160:3114-3120.
3. Dore, G.J., McDonald, A., Ree, H., Kaldo, J.M. Impact of highly active antiretroviral therapy on individual AODS-defining illness incidence and survival in Australia. *J Acquir Immune Defic Syndr*. 2002;29:388-395.
4. Fordyce, E.J., Singh, T.P., Nash, D., et al. Survival rates in NYC in the era of combination ART. *J Acquir Immune Defic Syndr*. 2002;30:111-118.
5. Hogg, R.S., Yip, B., Kully, C., et al. Improved survival among HIV-infected patients after initiation of triple-drug antiretroviral regimens. *CMAJ*. 1999;160:659-665.
6. Jacobson, L.P., Li, R., Margolick, J.B., et al. Evaluation of the effectiveness of highly active antiretroviral therapy in person with human immunodeficiency virus using biomarker-based equivalence of disease progression. *Am J Epidemiol*. 2002;155:760-770.
7. Murphy, E.L., Collier, E.C., Kalish, L.A., et al. Highly active antiretroviral therapy decreases mortality and morbidity in patients with advanced HIV disease. *Ann Intern Med* 2001;135:17-26
8. Palella, F.J., Delaney, K.M., Moorman, A.C., et al. Declining morbidity and mortality among patients with advanced human immunodeficiency virus infection. *N Engl J Med* 1998;338:853-860.
9. Valdez, H., Chowdhry, T.K., Asaad, R., et al. Changing spectrum of mortality due to human immunodeficiency virus: An analysis of 260 deaths during 1995-1999. *Clin Infect Dis*. 2001;32:1487-1493.
10. Panel on Clinical Practices for the treatment of HIV. Guidelines for using antiretroviral agents in HIV-infected adults and adolescents. *MMWR*. 2002;51:1-55.
11. Carpenter, C.C., Cooper, D.A., Fischl, M.A., et al. Antiretroviral therapy in adults: Updated recommendations of the International AIDS Society-USA Panel. *JAMA*. 2000;283:381-390.
12. Holtzer, C.D., Roland, M. The use of combination therapy in HIV-infected patients. *Ann Pharmacother*. 1999;33:198-209.

13. Morin, S.F., Kahn, J.G., Richards, T.A., Palacio, H. Eliminating racial and ethnic disparities in HIV care: The California report. San Francisco (CA): AIDS Policy Research Center & Institute for Health Policy Studies and AIDS Research Institute, University of California, San Francisco, Policy Monograph Series--2000 Mar.
14. Department of Health and Human Services (DHHS) and J. Kaiser Family Foundation, Guidelines for the use of antiretroviral agents in HIV-infected adults and adolescents, 1999 May 5.
15. Patterson, W.S. Antiretroviral therapies among clients with prescription costs covered solely by the California AIDS Drug Assistance Program. Rockville, MD: Health Resources and Services Administration (HRSA Report), 1999.
16. Kalichman, S.C., Rompa, D. Functional health literacy is associated with health status and health-related knowledge in people living with HIV-AIDS. *J Acquir Immune Defic Syndr.* 2000;25:337-344.
17. Russell, S. Blacks dying of AIDS faster: Many in San Francisco slow to seek care. San Francisco Chronicle, 2002 Jun 27;Sect. A:15
18. Gandhi, M., Bacchetti, P., Miotti, P., et al. Does sex influence HIV viral load? 9th Conference on Retroviruses and Opportunistic Infections; 2002 Feb 24-28; Seattle, WA.

FOOTNOTES

- A. For annual data, age was computed from the midpoint of the particular year of interest.
- B. For annual data, geographical location was based on residency of last prescription for the year of interest.
- C. Since ADAP clients were defined as any individual accessing at least one prescription, we defined ADAP mortality as the death of any of these clients. That is, no restrictions were set-up for ADAP clients or deaths such as length of stay in the program, whether or not the client was enrolled in ADAP at time of death, coverage group (100 percent funded by ADAP, Medi-Cal, and/or private insurance), continuous months of ADAP coverage only, or HIV/AIDS-related deaths only. Our intent was to provide a general snapshot on the mortality of typical ADAP clients.
- D. For 1997 and 1998, using ICD-9 death group codes, cancer = 9, 10, 11, 17, 19, 20, 21, and 22; and heart disease = 33, 34, 37, 38, and 39. For 1999, using ICD-10 death group codes, HIV/AIDS-related deaths = 39, 40, 41, 42, and 43; Cancer = 60, 63, 65, 66, 73, 77, 78, 89, 96, 99, and 101; Heart disease = 162, 165, 167, 168, 170, 172, 176, and 179; Accidental poisoning = 327 and 329; and Suicide = 331, 334, and 335. Other individual death group codes may belong in each of these broader categories but were not considered due to lack of occurrence.
- E. There are two methods for determining drug utilization patterns. The "client patterns method," which we used in this study, addresses the issue "what percentage of each client's prescriptions falls into each category of antiretroviral therapy?" Thus, the emphasis is on client-level data, and each client contributes equally to the results. In contrast, "the prescription patterns method" addresses the question "what percentage of the prescriptions dispensed falls into each treatment category?" The emphasis is on prescription-level data, and clients with more prescriptions will have a larger impact on the results.
- F. We used the May 5, 1999, DHHS guidelines (instead of the most current, February 4, 2002) for determining type of ARV therapy, because these guidelines were more appropriate to the timeframe of our study. The category names were later changed to those mentioned in the introduction section.
- G. Although age for all clients were based on the midpoint of our study, July 1998, age at time of death was based on the midpoint of the year of death. We compared the frequency distributions at time of death based on both computations and found the results to be similar.
- H. Only the three largest age groups were subjected to statistical analysis. Over 50 year olds were not included due to small sample sizes and to limit the number of pair-wise comparisons.

- I. In 1998, the difference between Whites and Hispanics/Latinos was marginally significant, $t(14,192) = 2.01$, $p < .044$.
- J. ADAP database and/or formulary do not include variables or prescription drugs for other co-morbid conditions such as alcoholism and other STDs. Hepatitis was based on clients accessing Interferon Alfa-2A, Interferon Alfa-2B, and Interferon Alfa-N3, which are also used to treat Kaposi's sarcoma and leukemia. Depression was based on clients accessing Amitriptyline, Bupropion, Desipramine, Fluoxetine, Nefazodone, Nortriptyline, Paroxetine, Sertraline, Trazodone, and Venlafaxine. Herpes was based on clients accessing Acyclovir and Valacyclovir. TB was based on clients accessing Ethambutol, which is also used to treat mycobacterium avium complex disease. Incarcerated clients accessed at least one prescription while in a local or county jail and may not have been in jail the entire year.

"Pure" hepatitis C drugs (Interferon Alfacon 1 and Ribavirin-Interferon Alfa 2B), anti-anxiety drugs (Alpraxolam, Buspirone, and Lorazepam), anti-psychotic drugs (Olanzapine, Quetiapine, and Risperidone), and "pure" TB drugs (Isoniazid, Pyrazinamide, Rifampin, and Rifampin/Isoniazid) were all added to the ADAP formulary in March 2000.

APPENDIX A: EXACT TEST BASED ON A BINOMIAL DISTRIBUTION

Let r_1 and r_2 be the estimated mortality rates for Group 1 and Group 2. Let t_1 and t_2 be the time at risk of death for Group 1 and Group 2. Let Y_1 and Y_2 be the random variables of number of deaths with realization denoted y_1 and y_2 in Group 1 and Group 2.

Assume: 1) $Y_1 \sim \text{Poisson}(r_1 t_1)$; and 2) $Y_2 \sim \text{Poisson}(r_2 t_2)$. Then we have

$$Y_1 = y_1 \mid Y_1 + Y_2 = y_1 + y_2 \sim \text{Binomial}(y_1 + y_2, r_1 t_1 / (r_1 t_1 + r_2 t_2)).$$

Under the null hypothesis $H_0: r_1 = r_2$, we have

$$y_1 = y_1 \mid y_1 + y_2 \sim \text{Binomial}(y_1 + y_2, t_1 / (t_1 + t_2)).$$

From Rosner, B.A. (1995). Fundamentals of Biostatistics (4th Ed.). Duxbury Press.

APPENDIX B: EXACT TEST STATISTICS FOR MORTALITY RATES BY DEMOGRAPHICS						
Method: Using Binomial distribution: d~Binom(n,p)						
Year	Group	death (d)	mth risk (t)	mortality rate	n=d1i+d2	Test Pair
1997	Male	136	148,938	0.00091	147	M v F
	Female	11	15,969	0.00069		
1998	Male	366	230,593	0.00159	401	M v F
	Female	35	27,141	0.00129		
1999	Male	504	290,199	0.00174	565	M v F
	Female	61	34,759	0.00175		
1997	White	69	80,353	0.00086	88	W v A
	African Amer	19	25,682	0.00074	72	A v L
	Hispanic/Latino	53	50,633	0.00105	122	W v L
1998	White	230	120,954	0.00190	284	W v A
	African Amer	54	44,008	0.00123	145	A v L
	Hispanic/Latino	91	77,474	0.00117	321	W v L
1999	White	292	148,600	0.00197	403	W v A
	African Amer	111	57,149	0.00194	237	A v L
	Hispanic/Latino	126	97,763	0.00129	418	W v L
1997	18-30 y/o	14	23,048	0.00061	79	18 v 31
	31-40 y/o	65	75,605	0.00086	119	31 v 41
	41-50 y/o	54	48,749	0.00111	68	18 v 41
1998	18-30 y/o	28	39,380	0.00071	173	18 v 31
	31-40 y/o	145	119,476	0.00121	287	31 v 41
	41-50 y/o	142	73,378	0.00194	170	18 v 41
1999	18-30 y/o	43	54,059	0.00080	257	18 v 31
	31-40 y/o	214	151,903	0.00141	417	31 v 41
	41-50 y/o	203	89,311	0.00227	246	18 v 41
1997	Title I/urban	138	152,637	0.00090	146	I v II
	Title II/rural	8	10,737	0.00075		
1998	Title I/urban	369	236,884	0.00156	398	I v II
	Title II/rural	29	18,590	0.00156		
1999	Title I/urban	519	363,462	0.00143	559	I v II
	Title II/rural	40	23,290	0.00172		
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.						

APPENDIX B: CONTINUED						
H0: ri=rj						
Year	Group	p=t1/(t1+t2)	prob(D<=d)	prob(D>=d)	p-value	Test Pair
1997	Male	0.90316	0.85255	0.22752	.455	M v F
	Female					
1998	Male	0.89469	0.89826	0.13569	.271	M v F
	Female					
1999	Male	0.89304	0.48934	0.56450	.979	M v F
	Female					
1997	White	0.75780	0.75453	0.33226	.665	W v A
	African Amer	0.33653	0.11779	0.92596	.236	A v L
	Hispanic/Latino	0.38655	0.88031	0.16033	.321	W v L
1998	White	0.73322	0.99899	0.00163	.003	W v A
	African Amer	0.36226	0.63594	0.43029	.861	A v L
	Hispanic/Latino	0.39044	0.00004	0.99998	.000	W v L
1999	White	0.72224	0.56033	0.48388	.968	W v A
	African Amer	0.36891	0.99930	0.00109	.002	A v L
	Hispanic/Latino	0.39683	0.00003	0.99998	.000	W v L
1997	18-30 y/o	0.23363	0.14557	0.90975	.291	18 v 31
	31-40 y/o	0.60798	0.09983	0.92888	.200	31 v 41
	41-50 y/o	0.67898	0.98744	0.02522	.050	18 v 41
1998	18-30 y/o	0.24790	0.00425	0.99764	.008	18 v 31
	31-40 y/o	0.61952	0.00005	0.99997	.000	31 v 41
	41-50 y/o	0.65076	1.00000	0.00000	.000	18 v 41
1999	18-30 y/o	0.26247	0.00020	0.99989	.000	18 v 31
	31-40 y/o	0.62974	0.00000	1.00000	.000	31 v 41
	41-50 y/o	0.62294	1.00000	0.00000	.000	18 v 41
1997	Title I/urban	0.93428	0.75000	0.37358	.747	I v II
	Title II/rural					
1998	Title I/urban	0.9272333	0.52453	0.55219	1.00000	I v II
	Title II/rural					
1999	Title I/urban	0.939780531	0.14987	0.88596	0.29974	I v II
	Title II/rural					
Significance based on p<.05 for two-group comparisons and p<.017 for three-group comparisons. California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.						

APPENDIX C: T-TEST STATISTICS FOR HOSPITAL DATA FOR ALL CLIENTS BY DEMOGRAPHICS					
Year	Group	Hospital Visits			
		t	df	p-value	Test Pair
1997	Male	1.87	18,076	.061	M v F
	Female				
1998	Male	0.14	18,300	.887	M v F
	Female				
1999	Male	0.63	20,879	.530	M v F
	Female				
1997	White	-0.28	11,641	.778	W v A
	African Amer	3.71	14,012	.000	W v H
	Hispanic/Latino	3.47	8,509	.001	A v H
1998	White	-4.06	11,406	.000	W v A
	African Amer	4.19	14,192	.000	W v H
	Hispanic/Latino	6.88	8,428	.000	A v H
1999	White	-4.15	12,985	.000	W v A
	African Amer	5.28	16,109	.000	W v H
	Hispanic/Latino	8.18	10,006	.000	A v H
1997	18-30 y/o	-5.18	11,700	.000	18 v 31
	31-40 y/o	-6.89	8,080	.000	18 v 41
	41-50 y/o	-2.45	13,242	.015	31 v 41
1998	18-30 y/o	-5.51	11,330	.000	18 v 31
	31-40 y/o	-7.22	8,020	.000	18 v 41
	41-50 y/o	-3.20	13,518	.001	31 v 41
1999	18-30 y/o	-5.39	12,450	.000	18 v 31
	31-40 y/o	-8.12	9,151	.000	18 v 41
	41-50 y/o	-4.92	15,717	.000	31 v 41
1997	Title I/urban	-1.66	18,081	.098	I v II
	Title II/rural				
1998	Title I/urban	-1.03	18,224	.303	I v II
	Title II/rural				
1999	Title I/urban	-0.90	20,591	.368	I v II
	Title II/rural				
Significance based on p<.05 for two-group comparisons and p<.017 for three-group comparisons.					
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.					

APPENDIX C: CONTINUED					
Year	Group	Length of Stay			
		t	df	p-value	Test pair
1997	Male	2.20	18,076	.028	M v F
	Female				
1998	Male	0.21	18,300	.832	M v F
	Female				
1999	Male	1.87	20,879	.061	M v F
	Female				
1997	White	-3.17	11,641	.002	W v A
	African Amer	-0.65	14,012	.516	W v H
	Hispanic/Latino	1.90	8,509	.057	A v H
1998	White	-4.10	11,406	.000	W v A
	African Amer	2.01	14,192	.044	W v H
	Hispanic/Latino	5.47	8,428	.000	A v H
1999	White	-5.47	12,985	.000	W v A
	African Amer	2.84	16,109	.004	W v H
	Hispanic/Latino	7.09	10,006	.000	A v H
1997	18-30 y/o	-3.93	11,700	.000	18 v 31
	31-40 y/o	-4.96	8,080	.000	18 v 41
	41-50 y/o	-1.03	13,242	.302	31 v 41
1998	18-30 y/o	-5.01	11,330	.000	18 v 31
	31-40 y/o	-6.39	8,020	.000	18 v 41
	41-50 y/o	-2.46	13,518	.014	31 v 41
1999	18-30 y/o	-4.28	12,450	.000	18 v 31
	31-40 y/o	-6.65	9,151	.000	18 v 41
	41-50 y/o	-3.55	15,717	.000	31 v 41
1997	Title I/urban	-0.50	18,081	.619	I v II
	Title II/rural				
1998	Title I/urban	-2.23	18,224	.026	I v II
	Title II/rural				
1999	Title I/urban	-1.83	20,591	.067	I v II
	Title II/rural				
Significance based on p<.05 for two-group comparisons and p<.017 for three-group comparisons.					
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.					

APPENDIX D: T-TEST STATISTICS FOR HOSPITAL DATA FOR HOSPITALIZED CLIENTS BY DEMOGRAPHICS					
Year	Group	Hospital Visits			
		t	df	p-value	Test Pair
1997	Male	0.11	1,520	.911	M v F
	Female				
1998	Male	0.19	1,895	.851	M v F
	Female				
1999	Male	-1.59	2,102	.113	M v F
	Female				
1997	White	1.14	1,058	.255	W v A
	African Amer	0.17	1,128	.864	W v H
	Hispanic/Latino	-1.06	662	.288	A v H
1998	White	-3.19	1,320	.001	W v A
	African Amer	-1.75	1,385	.000	W v H
	Hispanic/Latino	1.34	791	.102	A v H
1999	White	-2.08	1,481	.038	W v A
	African Amer	-0.79	1,507	.428	W v H
	Hispanic/Latino	1.19	926	.235	A v H
1997	18-30 y/o	-1.21	878	.226	18 v 31
	31-40 y/o	-1.18	654	.239	18 v 41
	41-50 y/o	1.36	1,190	.892	31 v 41
1998	18-30 y/o	1.33	997	.183	18 v 31
	31-40 y/o	1.23	782	.221	18 v 41
	41-50 y/o	-0.01	1,481	.995	31 v 41
1999	18-30 y/o	0.04	1,071	.965	18 v 31
	31-40 y/o	-0.66	923	.508	18 v 41
	41-50 y/o	-1.29	1,680	.198	31 v 41
1997	Title I/urban	-0.93	1,521	.352	I v II
	Title II/rural				
1998	Title I/urban	1.17	1,892	.241	I v II
	Title II/rural				
1999	Title I/urban	0.55	2,088	.281	I v II
	Title II/rural				
Significance based on p<.05 for two-group comparisons and p<.017 for three-group comparisons. California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.					

APPENDIX D: CONTINUED					
Year	Group	Length of Stay			
		t	df	p-value	Test Pair
1997	Male	0.96	1,520	.336	M v F
	Female				
1998	Male	0.26	1,895	.794	M v F
	Female				
1999	Male	0.068	2,102	.499	M v F
	Female				
1997	White	-3.19	1,058	.001	W v A
	African Amer	-5.23	1,128	.000	W v H
	Hispanic/Latino	-1.64	662	.102	A v H
1998	White	-3.15	1,320	.002	W v A
	African Amer	-3.39	1,385	.001	W v H
	Hispanic/Latino	-0.08	791	.938	A v H
1999	White	-3.96	1,481	.000	W v A
	African Amer	-3.10	1,507	.002	W v H
	Hispanic/Latino	1.15	926	.252	A v H
1997	18-30 y/o	-1.21	878	.226	18 v 31
	31-40 y/o	1.05	654	.295	18 v 41
	41-50 y/o	1.57	1,190	.116	31 v 41
1998	18-30 y/o	1.28	997	.203	18 v 31
	31-40 y/o	1.68	782	.094	18 v 41
	41-50 y/o	0.80	1,481	.424	31 v 41
1999	18-30 y/o	0.47	1,071	.635	18 v 31
	31-40 y/o	0.42	923	.678	18 v 41
	41-50 y/o	-0.15	1,680	.883	31 v 41
1997	Title I/urban	0.54	1,521	.592	I v II
	Title II/rural				
1998	Title I/urban	-0.75	1,892	.451	I v II
	Title II/rural				
1999	Title I/urban	-0.89	2,088	.372	I v II
	Title II/rural				
Significance based on p<.05 for two-group comparisons and p<.017 for three-group comparisons.					
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.					

APPENDIX E: EXACT TEST STATISTICS FOR AUAOP MORTALITY RATES BY ARV TREATMENT GROUP						
Method: Using Binomial distribution: $d \sim \text{Binom}(n, p)$						
Year	Group	death (d)	mth risk (t)	mortality rate	$n=d1i+d2$	Test Pair
1998	High	59	67,174	0.00088	74	H v M
	Medium	15	21,480	0.00070	78	H v L
	Low	63	35,643	0.00177	122	M v L
1999	High	92	94,655	0.00097	122	H v M
	Medium	30	26,438	0.00113	100	H v L
	Low	70	43,827	0.00160	162	M v L
H0: $r_i = r_j$						
Year	Group	$p=t1/(t1+t2)$	$\text{prob}(D \leq d)$	$\text{prob}(D \geq d)$	p-value	Test Pair
1998	High	0.75771	0.82318	0.25938	.259	H v M
	Medium	0.37603	0.00037	0.99986	.000	H v L
	Low	0.34666	0.99996	0.00009	.000	M v L
1999	High	0.78167	0.26110	0.80312	.261	H v M
	Medium	0.37626	0.06905	0.95510	.069	H v L
	Low	0.31648	0.99924	0.00131	.001	M v L
Significance based on $p < .017$.						
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.						

APPENDIX F: T-TEST STATISTICS FOR HOSPITAL DATA FOR AUAOP BY ARV TREATMENT GROUP					
Year	Group	Hospital Visits			
		t	df	p-value	Test Pair
1998	High	-1.66	568	.097	H v M
	Medium	-2.40	657	.017	H v L
	Low	-0.48	399	.635	M v L
1999	High	0.03	679	.977	H v M
	Medium	-2.23	737	.026	H v L
	Low	-1.54	388	.124	M v L
Year	Group	Length of Stay			
		t	df	p-value	Test Pair
1998	High	2.19	568	.029	H v M
	Medium	-0.08	657	.933	H v L
	Low	-2.23	399	.026	M v L
1999	High	0.46	679	.644	H v M
	Medium	1.88	737	.060	H v L
	Low	1.29	388	.165	M v L
Significance based on $p < .017$.					
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.					

TABLE 1: ADAP CLIENTS BY SERVICE YEARS					
Annual	Frequency in Service Years				Total
	& 97	& 98	& 99	97-99	
1997	5,598	2,597	766	9,212	18,173
1998	2,597	1,710	4,792	9,212	18,311
1999	766	4,792	6,116	9,212	20,886
Total	Unduplicated				30,791
Annual	Percentage in Service Years				Total
	& 97	& 98	& 99	97-99	
1997	18.18%	8.43%	2.49%	29.92%	
1998		5.55%	15.56%		
1999			19.86%		
Total	Unduplicated				100.00%
Clients in the diagonal accessed services in only one year.					
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.					

TABLE 2: LENGTH OF STAY IN ADAP				
Annual	Statistic			Total
	Mean	SD	Median	
1997	5.59	3.73	5.00	18,173
1998	6.61	3.87	7.00	18,311
1999	6.89	4.00	7.00	20,886
Total	11.90	1.05	8.00	30,791
Length of stay based on months client accessed services. California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.				

TABLE 3: ADAP CLIENTS BY DEMOGRAPHICS				
Gender				
Gender	1997	1998	1999	Undup
Male	89.30%	90.19%	90.08%	89.08%
Female	10.18%	9.76%	9.90%	10.67%
Unknown	0.52%	0.05%	0.02%	0.25%
Total	18,173	18,311	20,886	30,791
Race/Ethnicity				
Race/Ethnicity	1997	1998	1999	Undup
White	47.17%	46.89%	45.70%	45.35%
African Amer	16.89%	15.41%	16.48%	17.75%
Hispanic/Latino	29.94%	30.63%	31.44%	29.89%
Other	3.01%	2.78%	2.68%	1.69%
Unknown	2.98%	4.29%	3.70%	5.31%
Total	18,173	18,311	20,886	30,791
Age Group				
Age Group	1997	1998	1999	Undup
18-30 y/o	17.99%	15.93%	14.09%	16.91%
31-40 y/o	46.40%	45.96%	45.53%	46.31%
41-50 y/o	26.48%	27.88%	29.73%	27.35%
Over 50 y/o	9.11%	10.19%	10.61%	9.39%
Unknown	0.02%	0.05%	0.03%	0.05%
Total	18,173	18,311	20,886	30,791
Grant Funding				
Geog Location	1997	1998	1999	Undup
Title I/urban	92.56%	92.87%	92.16%	91.36%
Title II/rural	6.94%	6.67%	6.43%	7.10%
Unknown	0.50%	0.46%	1.40%	1.54%
Total	18,173	18,311	20,886	30,791
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.				

TABLE 4: DEATHS BY SERVICE YEARS

Year of Death	Frequency of Deaths by Service Years							Total
	1997	1998	1999	97 & 98	97 & 99	98 & 99	97-99	
1997	147							147
1998	93	97		211				401
1999	52	65	94	85	8	96	165	565
Total	Unduplicated							1,113
Year of Death	Percentage of Deaths by Service Years							Total
	1997	1998	1999	97 & 98	97 & 99	98 & 99	97-99	
1997	13.21%							13.21%
1998	8.36%	8.72%		18.96%				36.03%
1999	4.67%	5.84%	8.45%	7.64%	0.72%	8.63%	14.82%	50.76%
Total	Unduplicated							100.00%
Clients in highlighted diagonal accessed services in only one year and died within the same year.								
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.								

TABLE 5: LEADING CAUSE OF DEATH		
1997		
Cause	N	%
HIV/AIDS-related	98	66.67%
Cancer	19	12.93%
Heart disease	6	4.08%
Hepatitis	5	3.40%
Accidental poisoning	4	2.72%
All others	15	10.20%
Total	147	100.00%
1998		
Cause	N	%
HIV/AIDS-related	234	58.35%
Cancer	43	10.72%
Heart disease	20	4.99%
Hepatitis	19	4.74%
Accidental poisoning	15	3.74%
All others	70	17.46%
Total	401	100.00%
1999		
Cause	N	%
HIV/AIDS-related	385	68.14%
Heart Disease	34	6.02%
Cancer	29	5.13%
Accidental poisoning	24	4.25%
Suicide	15	2.65%
All others	78	13.81%
Total	565	100.00%
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.		

TABLE 6: MORTALITY RATES BY DEMOGRAPHICS

Year	Gender	Clients	Deaths	Months At Risk	Mortality Rate
1997	Male	16,254	136	148,938	0.91
	Female	1,855	11	15,969	0.69
1998	Male	5,742	366	230,593	1.59
	Female	752	35	27,141	1.29
1999	Male	5,433	504	290,199	1.74
	Female	677	61	34,759	1.75
Year	Race/Ethnicity	Clients	Deaths	Months At Risk	Mortality Rate
1997	White	8,659	69	80,353	0.86
	African Amer	3,020	19	25,682	0.74
	Hispanic/Latino	5,466	53	50,633	1.05
1998	White	2,784	230	120,954	1.90(a)
	African Amer	1,223	54	44,008	1.23(b)
	Hispanic/Latino	1,910	91	77,474	1.17(b)
1999	White	2,522	292	148,600	1.97(a)
	African Amer	1,223	111	57,149	1.94(a)
	Hispanic/Latino	1,828	126	97,763	1.29(b)
Year	Age Group	Clients	Deaths	Months At Risk	Mortality Rate
1997	18-30 y/o	2,619	14	23,048	0.61
	31-40 y/o	8,344	65	75,605	0.86
	41-50 y/o	5,281	54	48,749	1.11
1998	18-30 y/o	1,237	28	39,380	0.71(a)
	31-40 y/o	3,059	145	119,476	1.21(b)
	41-50 y/o	1,671	142	73,378	1.94(c)
1999	18-30 y/o	1,350	43	54,059	0.80(a)
	31-40 y/o	2,857	214	151,903	1.41(b)
	41-50 y/o	1,469	203	89,311	2.27(c)
Year	Geographical Location	Clients	Deaths	Months At Risk	Mortality Rate
1997	Title I/urban	16,625	138	152,637	0.90
	Title II/rural	1,298	8	10,737	0.75
1998	Title I/urban	6,005	369	236,884	1.56
	Title II/rural	480	29	18,590	1.56
1999	Title I/urban	5,501	519	363,462	1.43
	Title II/rural	409	40	23,290	1.72

Clients refer to the cumulative number of unduplicated living clients.

For 1998 and 1999, deaths include clients served in previous year(s).

Mortality rates are per 1,000 client months.

For each year, mortality rates with different letters in parentheses differ, $p < .05$ for two-group comparisons or $p < .017$ for three-group comparisons, based on a binomial test statistic.

California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.

TABLE 7: SUMMARY OF HIV-RELATED HOSPITALIZATIONS			
Statistic	1997	1998	1999
Total number of hospitalizations	2,514	3,503	3,892
Total length of stay spent in hospital	16,816	24,991	27,632
Longest length of stay in hospital	126	161	204
Annual Clients	18,173	18,311	20,886
Mean number of hospitalizations	0.14	0.19	0.19
Mean length of stay	0.93	1.36	1.32
Hospitalized Clients Only	1,525	1,897	2,104
Mean number of hospitalizations	1.65	1.85	1.85
Mean length of stay	11.03	13.17	13.13
Median length of stay	7.00	7.00	7.00
Note: Length of stay spent in hospital based on number of days.			
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.			

TABLE 8: LEADING CAUSE OF HOSPITALIZATION		
1997		
Cause	N	%
HIV Infection	1,258	50.04%
Pneumonia	49	1.95%
Pneumocytosis	44	1.75%
Pancreatitis	36	1.43%
Clinical research exam	36	1.43%
All others	1,091	43.40%
Total	2,514	100.00%
1998		
Cause	N	%
HIV Infection	1,792	51.16%
Pneumonia	70	2.00%
Pneumocytosis	44	1.26%
Major depressive disorder	44	1.26%
Clinical research exam	39	1.11%
All others	1,514	43.22%
Total	3,503	100.00%
1999		
Cause	N	%
HIV Infection	1,717	44.12%
Pneumonia	107	2.75%
Pancreatitis	45	1.16%
Pneumocytosis	44	1.13%
Major depressive disorder	42	1.08%
All others	1,937	49.77%
Total	3,892	100.00%
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.		

TABLE 9: MEAN HOSPITAL VISITS AND LENGTH OF STAY FOR ALL CLIENTS BY DEMOGRAPHICS				
Year	Gender	All Clients	Mean Visits	Mean Stay
1997	Male	16,228	0.14	0.57(a)
	Female	1,850	0.12	0.43(b)
1998	Male	16,514	0.19	0.70
	Female	1,788	0.19	0.69
1999	Male	18,814	0.19	0.70
	Female	2,067	0.18	0.56
Year	Race/Ethnicity	All Clients	Mean Visits	Mean Stay
1997	White	8,573	0.15(a)	0.52(a)
	African Amer	3,070	0.15(a)	0.68(b)
	Hispanic/Latino	5,441	0.11(b)	0.55
1998	White	8,586	0.19(a)	0.68(a)
	African Amer	2,822	0.26(b)	0.97(b)
	Hispanic/Latino	5,608	0.14(c)	0.58(a)
1999	White	9,545	0.19(a)	0.65(a)
	African Amer	3,442	0.25(b)	1.03(b)
	Hispanic/Latino	6,566	0.13(c)	0.52(c)
Year	Age Group	All Clients	Mean Visits	Mean Stay
1997	18-30 y/o	3,270	0.08(a)	0.36(a)
	31-40 y/o	8,432	0.14(b)	0.58(b)
	41-50 y/o	4,812	0.17(b)	0.63(c)
1998	18-30 y/o	2,917	0.10(a)	0.38(a)
	31-40 y/o	8,415	0.19(b)	0.67(b)
	41-50 y/o	5,105	0.23(c)	0.80(c)
1999	18-30 y/o	2,943	0.10(a)	0.38(a)
	31-40 y/o	9,509	0.17(b)	0.65(b)
	41-50 y/o	6,210	0.23(c)	0.84(c)
Year	Geographical Location	All Clients	Mean Visits	Mean Stay
1997	Title I/urban	16,821	0.14	0.56
	Title II/rural	1,262	0.16	0.60
1998	Title I/urban	17,005	0.19	0.69(a)
	Title II/rural	1,221	0.21	0.90(b)
1999	Title I/urban	19,249	0.19	0.68
	Title II/rural	1,344	0.21	0.84
Clients refer to the annual number of unduplicated clients. For each year, mean visits and stays with different letters in parentheses differ, $p < .05$ for pairwise comparisons or $p < .017$ for three-group comparisons. California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.				

TABLE 10: MEAN HOSPITAL VISITS AND LENGTH OF STAY FOR HOSPITALIZED CLIENTS BY DEMOGRAPHICS

Year	Gender	Hosp Clients	Mean Visits	Mean Stay
1997	Male	1,392	1.65	6.68
	Female	130	1.64	6.08
1998	Male	1,712	1.85	6.80
	Female	185	1.83	6.65
1999	Male	1,924	1.83	6.80
	Female	180	2.03	6.39
Year	Race/Ethnicity	Hosp Clients	Mean Visits	Mean Stay
1997	White	763	1.66	5.81(a)
	African Amer	297	1.57	7.03(b)
	Hispanic/Latino	367	1.65	8.11(b)
1998	White	958	1.74(a)	6.13(a)
	African Amer	364	2.03(b)	7.54(b)
	Hispanic/Latino	429	1.88	7.58(b)
1999	White	1,032	1.75	6.01(a)
	African Amer	451	1.93	7.83(b)
	Hispanic/Latino	477	1.81	7.19(b)
Year	Age Group	Hosp Clients	Mean Visits	Mean Stay
1997	18-30 y/o	172	1.55	6.80
	31-40 y/o	708	1.68	6.88
	41-50 y/o	484	1.67	6.26
1998	18-30 y/o	150	2.03	7.42
	31-40 y/o	849	1.85	6.69
	41-50 y/o	634	1.85	6.44
1999	18-30 y/o	158	1.81	7.04
	31-40 y/o	915	1.80	6.72
	41-50 y/o	767	1.90	6.78
Year	Geographical Location	Hosp Clients	Mean Visits	Mean Stay
1997	Title I/urban	1,404	1.64	6.66
	Title II/rural	119	1.75	6.31
1998	Title I/urban	1,743	1.86	6.74
	Title II/rural	152	1.71	7.20
1999	Title I/urban	1,935	1.85	6.72
	Title II/rural	155	1.78	7.31

Clients refer to the annual number of unduplicated clients.

For each year, mean visits and stays with different letters in parentheses differ, $p < .05$ for pairwise comparisons or $p < .017$ for three-group comparisons.

California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.

TABLE 11: VIRAL LOAD TESTS BY DEMOGRAPHICS

Gender							
Year	Gender	<1,501	1,501-7,000	7,001-20,000	20,001-55,000	>55,000	Total
1998	Male	45.96%	14.14%	11.65%	11.82%	16.43%	5,459
	Female	51.95%	15.10%	9.42%	11.20%	12.34%	616
1999	Male	47.94%	12.26%	11.13%	11.80%	16.88%	6,926
	Female	50.24%	14.11%	11.19%	8.64%	15.82%	822
Race/Ethnicity							
Year	Race/Ethnicity	<1,501	1,501-7,000	7,001-20,000	20,001-55,000	>55,000	Total
1998	White	50.47%	12.54%	11.30%	10.70%	14.98%	2,336
	African Amer	42.01%	14.45%	13.32%	13.11%	17.11%	976
	Hisp/Latino	43.79%	16.55%	11.05%	12.01%	16.59%	2,489
1999	White	49.59%	12.23%	10.13%	10.94%	17.10%	2,714
	African Amer	44.26%	13.01%	12.55%	11.55%	18.63%	1,299
	Hisp/Latino	48.44%	12.73%	11.06%	11.80%	15.97%	3,363
Age Group							
Year	Age Group	<1,501	1,501-7,000	7,001-20,000	20,001-55,000	>55,000	Total
1998	18-30 y/o	43.85%	14.47%	12.59%	13.12%	15.97%	1,334
	31-40 y/o	45.20%	14.03%	11.44%	11.86%	17.47%	3,051
	41-50 y/o	48.94%	14.52%	11.35%	10.59%	14.60%	1,322
1999	18-30 y/o	43.24%	12.06%	12.75%	12.96%	18.99%	1,443
	31-40 y/o	48.05%	12.18%	11.04%	11.67%	17.07%	3,942
	41-50 y/o	49.49%	13.52%	10.88%	10.39%	15.72%	1,857
Grant Funding							
Year	Geog Location	<1,501	1,501-7,000	7,001-20,000	20,001-55,000	>55,000	Total
1998	Title I/urban	46.65%	14.28%	11.60%	11.69%	15.78%	5,708
	Title II/rural	43.70%	14.08%	9.09%	13.20%	19.94%	341
1999	Title I/urban	48.18%	12.52%	11.12%	11.39%	16.80%	7,430
	Title II/rural	48.21%	11.40%	11.73%	13.68%	14.98%	307
Viral load categories are based on PCR tests. The equivalent categories for bDNA tests are <501, 501-3,000, 3,001-10,000, 10,000-30,000 and >30,000.							
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.							

TABLE 12: AUAOP CLIENTS BY DEMOGRAPHICS			
Gender			
Gender	1998	1999	Undup
Male	89.04%	88.71%	88.42%
Female	10.96%	11.28%	11.52%
Unknown	0.00%	0.01%	0.06%
Total	12,249	13,098	15,539
Race/Ethnicity			
Race	1998	1999	Undup
White	39.20%	37.22%	37.67%
African Amer	16.35%	17.32%	17.79%
Hispanic/Latino	37.13%	39.07%	37.37%
Other	2.72%	2.66%	1.43%
Unknown	4.60%	3.73%	5.74%
Total	12,249	13,098	15,539
Age Group			
Age	1998	1999	Undup
18-30 y/o	19.69%	17.32%	21.40%
31-40 y/o	48.27%	49.05%	48.36%
41-50 y/o	24.37%	25.78%	23.35%
Over 50 y/o	7.65%	7.83%	6.86%
Unknown	0.02%	0.02%	0.03%
Total	12,249	13,098	15,539
Grant Funding			
Geog Location	1998	1999	Undup
Title I/urban	93.98%	93.56%	93.71%
Title II/rural	5.45%	5.21%	5.39%
Unknown	0.57%	1.23%	0.91%
Total	12,249	13,098	15,539
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.			

TABLE 13: MORTALITY RATES FOR AUAOP BY ARV TREATMENT GROUP

Year	ARV Group	Clients	Deaths	Months At Risk	Mortality Rate
1998	High	6,669	59	67,174	0.88(a)
	Medium	2,023	15	21,480	0.70(a)
	Low	3,312	63	35,643	1.77(b)
1999	High	2,429	92	94,655	0.97(a)
	Medium	330	30	26,438	1.13
	Low	776	70	43,827	1.60(b)

Clients refer to the cumulative number of unduplicated living clients.

ARV Group based on the amount of preferred ARV combinations accessed in accordance with treatment guidelines, High = 76% or more, Medium = 51-75%, and Low = 50% or less.

For 1999, deaths include clients served in previous year.

Mortality rates are per 1,000 client months.

For each year, mortality rates with different letters in parentheses differ, $p < .017$, based on a Binomial test statistic.

California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.

**TABLE 14: MEAN HOSPITAL VISITS AND LENGTH OF STAY
FOR AUAOP BY ARV TREATMENT GROUP**

Year	ARV Group	All Clients	Mean Visits	Mean Stay
1998	High	414	1.66(a)	7.36
	Medium	156	1.86	5.92
	Low	245	1.93(b)	7.41
1999	High	515	1.65	7.23
	Medium	166	1.65	6.83
	Low	224	1.93	5.90

Clients refer to the annual number of unduplicated clients.

ARV Group based on the amount of preferred ARV combinations accessed in accordance with treatment guidelines, High = 76% or more, Medium = 51-75%, and Low = 50% or less.

For each year, mean visits and stays with different letters in parentheses differ, $p < .05$ for pairwise comparisons or $p < .017$ for three-group comparisons.

California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.

TABLE 15: LOGISTIC REGRESSION MODEL OF AUAOP DEATHS							
Variable	Group	Full Model					
		Beta	Std Error	p-value	OR	95% CI	
Intercept	***	-3.68	0.23	.000	***	***	***
Gender	Male	***	***	***	***	***	***
	Female	0.00	0.18	.985	1.00	0.69	1.43
Race/ Ethnicity	White	***	***	***	***	***	***
	African Amer	-0.05	0.16	.725	0.95	0.70	1.29
	Hispanic/Latino	-0.32	0.14	.024	0.73	0.55	0.96
	Other	0.65	0.35	.067	1.91	0.96	3.82
Age	18-30 y/o	***	***	***	***	***	***
	31-40 y/o	0.32	0.19	.099	1.38	0.94	2.01
	41-50 y/o	0.87	0.20	.000	2.38	1.61	3.52
	Over 50 y/o	1.39	0.23	.000	4.01	2.57	6.24
Geog Location	Title I/urban	***	***	***	***	***	***
	Title II/rural	0.24	0.23	.281	1.28	0.82	1.99
ARV Treatment	Low	***	***	***	***	***	***
	Medium	-0.57	0.18	.002	0.56	0.39	0.81
	High	-0.64	0.13	.000	0.53	0.41	0.67
Stay Ratio	***	-0.29	0.19	.121	0.75	0.52	1.08
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.							

TABLE 16: FINAL LOGISTIC REGRESSION MODEL OF AUAOP DEATHS

Variable	Group	Final Model					
		Beta	Std Error	p-value	OR	95% CI	
Intercept	***	-3.83	0.20	.000	***	***	***
Race/ Ethnicity	White	***	***	***	***	***	***
	African Amer	-0.03	0.15	.868	0.98	0.72	1.31
	Hispanic/Latino	-0.33	0.14	.020	0.72	0.55	0.95
	Other	0.66	0.35	.062	1.93	0.97	3.86
Age	18-30 y/o	***	***	***	***	***	***
	31-40 y/o	0.31	0.19	.107	1.36	0.94	1.99
	41-50 y/o	0.85	0.20	.000	2.35	1.59	3.46
	Over 50 y/o	1.35	0.23	.000	3.87	2.49	6.03
ARV Treatment	Low	***	***	***	***	***	***
	Medium	-0.58	0.18	.002	0.56	0.39	0.80
	High	-0.66	0.13	.000	0.52	0.41	0.66

California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.

TABLE 17: ADAP CO-MORBIDITIES		
1997		
Co-Morbidity	N	%
Hepatitis C	65	0.36%
STD (herpes)	4,840	26.63%
TB	504	2.77%
Total Co-Morbidities	5,409	n/a
Unique clients with co-morbidity	5,159	28.39%
Total Clients	18,173	n/a
1998		
Co-Morbidity	N	%
Hepatitis C	74	0.40%
Incarceration	854	4.66%
Mental illness (depression)	1,523	8.32%
STD (herpes)	4,653	25.41%
TB	434	2.37%
Total Co-Morbidities	7,538	n/a
Unique clients with co-morbidity	6,542	35.73%
Total Clients	18,311	n/a
1999		
Co-Morbidity	N	%
Hepatitis C	65	0.31%
Homelessness	99	0.47%
Incarceration	1,959	9.38%
Mental illness (depression)	4,113	19.69%
STD (herpes)	5,001	23.94%
TB	445	2.13%
Total Co-Morbidities	11,682	n/a
Unique clients with co-morbidity	9,459	45.29%
Total Clients	20,886	n/a
Variable identifying homeless clients was not available in 1997 and 1998.		
Variable identifying incarcerated clients was not available in 1997.		
Anti-depressants were not added to the formulary until September 1998.		
California Department of Health Services, Office of AIDS, AIDS Drug Assistance Program.		

FIGURE 1. MORTALITY RATES FOR ALL ADAP CLIENTS AND BY GENDER.

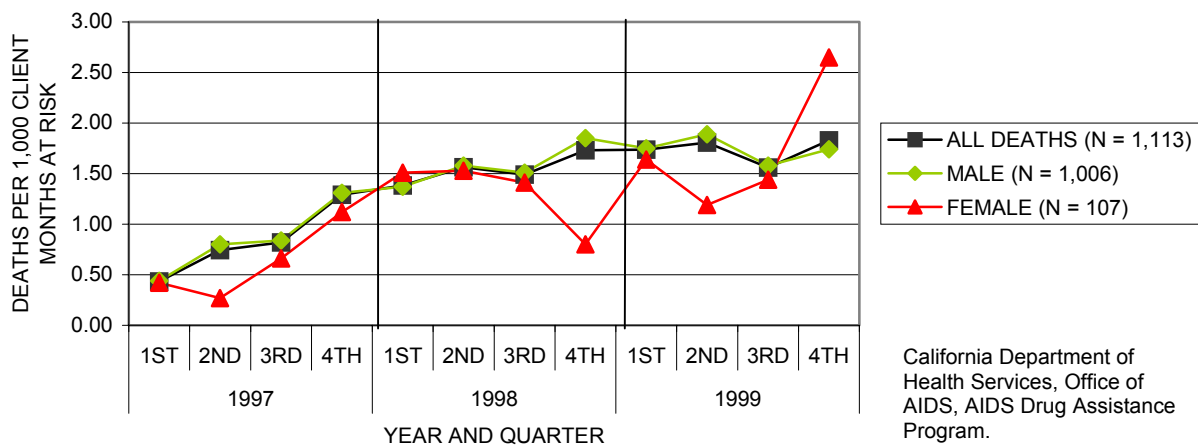


FIGURE 2. MEAN HOSPITALIZATIONS FOR ALL ADAP CLIENTS AND BY GENDER.

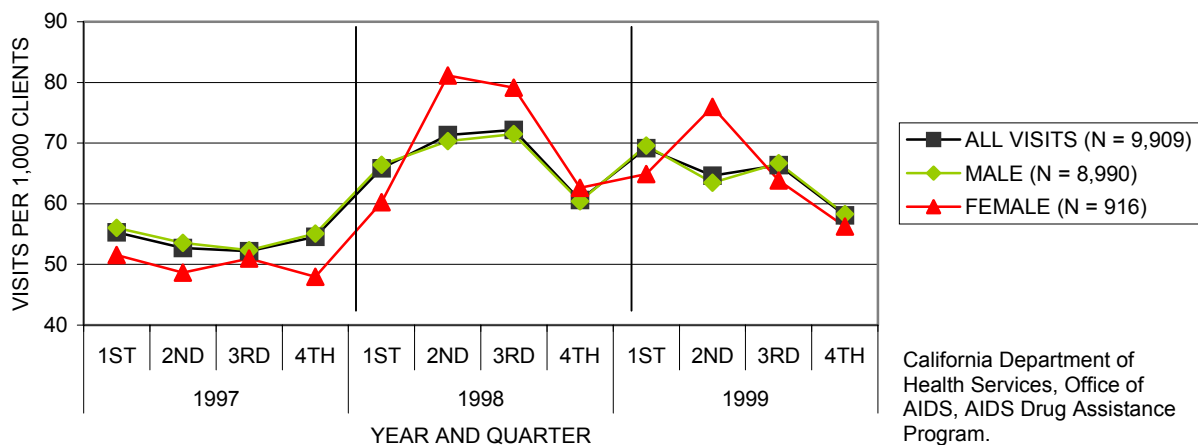


FIGURE 3. MEAN LENGTH OF STAY FOR ALL ADAP CLIENTS AND BY GENDER.

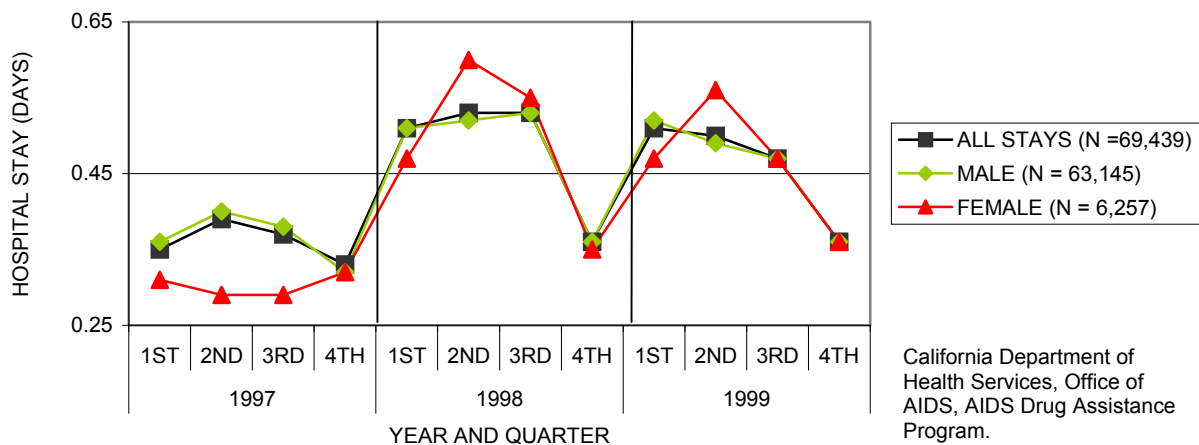


FIGURE 4. MORTALITY RATES FOR AUAOP AND BY ANTIRETROVIRAL TREATMENT GROUP.

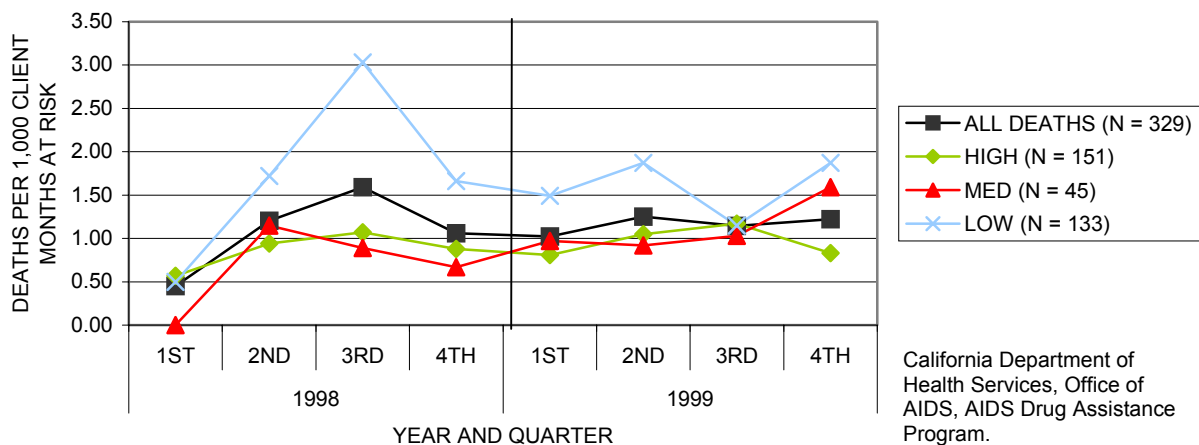


FIGURE 5. MEAN HOSPITALIZATIONS FOR AUAOP AND BY ANTIRETROVIRAL TREATMENT GROUP.

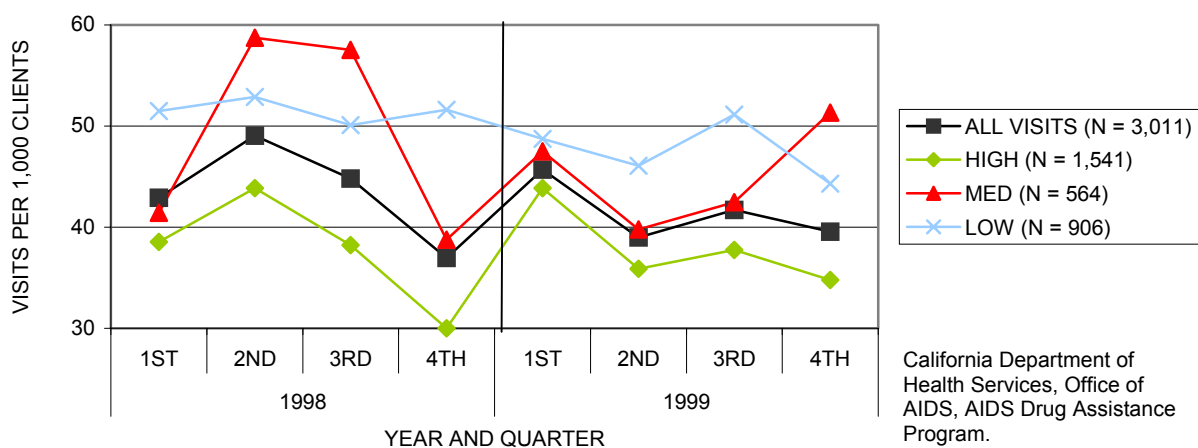
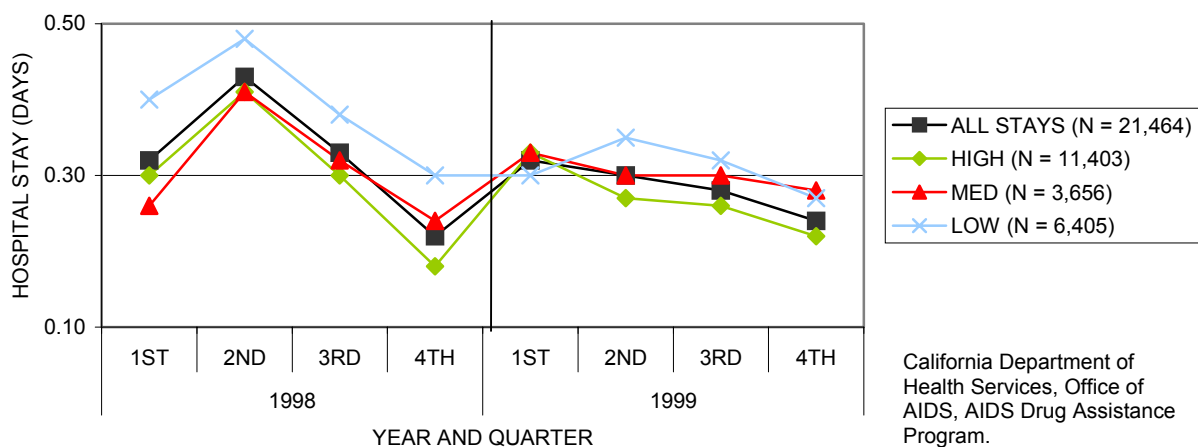


FIGURE 6. MEAN LENGTH OF STAY FOR AUAOP AND BY ANTIRETROVIRAL TREATMENT GROUP.



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